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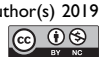

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Prevalence and Correlates of Youth Suicidal Ideation and Attempts: Evidence from the 2014 Ontario Child Health Study

Prévalence et corrélats de l'idéation et des tentatives de suicide chez les adolescents : données probantes de l'Étude sur la santé des jeunes Ontariens 2014

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Abstract

Objectives: To present the 12-month prevalence and correlates of suicidal ideation and attempts in a sample of youth in Ontario.

Methods: Data come from the 2014 Ontario Child Health Study, a provincially representative survey of families with children in Ontario. Youth aged 14 to 17 y ($n = 2,396$) completed a computer-assisted, self-administered questionnaire in their home to assess the occurrence of suicidal ideation, suicidal attempts, and associated correlates, including non-suicidal self-injury,

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mental disorders, substance use, peer victimization and exposure to child maltreatment. Socio-demographic information was collected from the parent. Logistic regression models were used to identify correlates that distinguished between youth reporting: 1) no suicidal ideation or attempts, 2) suicidal ideation but no attempts, and 3) suicidal ideation and attempts.

Results: The 12-month prevalence of suicidal ideation and attempts was 8.1% and 4.3%, respectively. All clinical and behavioural correlates were significantly higher among youth reporting suicidal ideation or attempts, as compared with non-suicidal youth. In adjusted models, depression and non-suicidal self-injury were each independently associated with elevated odds of suicidal ideation (OR = 4.84 and 4.19, respectively) and suicidal attempt (OR = 7.84 and 22.72, respectively). Among youth who reported suicidal ideation, the only variable that differentiated youth who attempted suicide v. those who did not, in adjusted models, was non-suicidal self-injury (OR = 3.89).

Conclusions: Suicidal ideation and attempts are common among youth in Ontario, often co-occurring with mental disorders and high-risk behaviours. These findings underscore the need for effective prevention and intervention strategies, particularly for youth depression and non-suicidal self-injury.

Abrégé

Objectifs : Présenter la prévalence de 12 mois et les corrélats de l'idéation et des tentatives de suicide dans un échantillon d'adolescents en Ontario.

Méthodes : Les données proviennent de l'Étude sur la santé des jeunes Ontariens 2014, une étude représentative à l'échelle provinciale de familles comportant des enfants en Ontario. Les adolescents âgés de 14 à 17 ans (n = 2 396) ont rempli à domicile un questionnaire auto-administré assisté par ordinateur afin d'évaluer l'occurrence de l'idéation suicidaire, des tentatives de suicide et des corrélats associés, notamment l'automutilation non suicidaire, les troubles mentaux, l'utilisation de substances, la victimisation par les pairs et l'exposition à la maltraitance des enfants. Les données sociodémographiques ont été recueillies auprès du parent. Des modèles de régression logistique ont servi à identifier les corrélats qui distinguaient entre les adolescents déclarant 1) aucune idéation ou tentative de suicide, 2) une idéation mais pas de tentatives de suicide, et 3) idéation et tentatives de suicide.

Résultats : La prévalence de 12 mois de l'idéation suicidaire et des tentatives de suicide était de 8,1% et de 4,3%, respectivement. Tous les corrélats cliniques et comportementaux étaient significativement plus élevés chez les adolescents déclarant une idéation ou des tentatives de suicide, comparativement aux adolescents non suicidaires. Dans les modèles ajustés, la dépression et l'automutilation non suicidaire étaient chacune associées indépendamment à des probabilités élevées d'idéation suicidaire (RC = 4,84 et 4,19 respectivement) et de tentative de suicide (RC = 7,84 et 22,72 respectivement). Chez les adolescents qui déclaraient une idéation suicidaire, la seule variable qui différentiait les adolescents qui avaient fait des tentatives de suicide de ceux qui n'en avaient pas fait, dans les modèles ajustés, était l'automutilation non suicidaire (RC = 3,89).

Conclusions : L'idéation suicidaire et les tentatives de suicide sont répandues chez les adolescents de l'Ontario, et sont souvent co-occurrentes avec les troubles mentaux et les comportements à risque élevé. Ces résultats font ressortir le besoin de stratégies efficaces de prévention et d'intervention, en particulier pour la dépression et l'automutilation non suicidaire chez les adolescents.

Keywords

suicidal ideation, suicidal attempts, youth, ontario, correlates

Suicidal thoughts and behaviours typically emerge during adolescence[1] and represent a serious public health concern because of their association with completed suicide[2]—the second leading cause of death among adolescents in Canada.[3] At present, epidemiological evidence in Canada on the prevalence and associated features of adolescent suicidal thoughts and behaviours is sparse, restricted to: 1) school-based surveys that exclude adolescents out of school;[4] 2) measurement and analytic approaches that fail to distinguish between suicidal ideation and attempts and associated correlates;[5-7] 3) limited age ranges;[8] 4) emergency department self-harm visits that do not ascertain intention to die;[9] and 5) vital statistics on death by suicide,[3,9,10] which represent a small fraction of adolescents who may have experienced suicidal thoughts and behaviours. The 2014 Ontario Child Health Study (OCHS) provides an opportunity to strengthen the Canadian knowledge base by documenting the prevalence and correlates of suicidal ideation and attempts in a representative, population-based sample of Ontario youth aged 14 to 17 years.

Prevalence estimates of adolescent suicidal thoughts and behaviours vary dramatically across countries and study designs.[1,11-14] For example, the 12-month prevalence of reported suicidal ideation (14.7% to 17.2%) and attempts (4.0% to 7.4%) are higher in school surveys[4,11] compared to household surveys, where estimates range from 3.6% to

7.7% for suicidal ideation and 1.0% to 3.2% for suicidal attempts.[6,8,15] Despite differences in prevalence, there is consistency across studies in terms of the characteristics and experiences associated with suicidal thoughts and behaviours.[1,2,16] For example, adolescent females, compared to males, are more likely to report suicidal ideation and attempts; however, death by suicide is more prevalent among adolescent males.[1,12,14] Suicidal thoughts and behaviours are associated with several mental disorders, including mood, anxiety, conduct, and substance use disorders.[1,12,14,16,17] Previous suicidal ideation and attempts, a family history of suicidal behaviours, exposure to childhood maltreatment, and peer victimization are reported to increase the risk for subsequent suicidal ideation and attempts.[1,2,12,16] Finally, non-suicidal self-injury—defined as intentional self-harm without the intent to die—appears to be a particularly strong risk factor for suicidal attempts[2,18] and possibly suicidal ideation and plans.[19-22]

Studies seeking to identify correlates or risk factors of suicidal thoughts and behaviours typically compare adolescents who endorse suicidal ideation or attempts to non-suicidal individuals[5,6,8,15] (for exceptions, see previous studies[14,21,23,24]). This approach, however, does not examine factors that differentiate between adolescents who report both suicidal ideation and attempt from those who report ideation but no attempt. Distinguishing between these 2 groups is important. From a theoretical perspective, a comprehensive model needs to clarify the pathways that lead to the emergence of suicidal ideation and the transition from ideation to attempt. From a clinical perspective, health care professionals are responsible for determining risk of suicidal attempt in their patient populations and effectively intervening.

Converging theoretical and empirical evidence suggests that well-established risk factors for suicide strongly predict suicidal ideation (i.e., mood, anxiety, conduct, and substance use disorders), but only weakly or inconsistently predict suicidal attempts among those who experience suicidal ideation.[14,17,25-27] Most of these studies have focused on the predictive utility of mental disorders,[14,17,25,26] with few specifically examining whether non-suicidal self-injury distinguishes between these groups (for exceptions, see previous studies[20,21]). Evidence from 2 studies, one using a school-based survey of adolescents in the US[21] and another based on an epidemiological survey of college students in Belgium and Australia,[20] found that non-suicidal self-injury was associated with increased odds of suicidal attempts among individuals who endorsed suicidal ideation, even after controlling for mental disorders. These findings provide insight into the potential role that non-suicidal self-injury might play in the transition from ideation to attempt, while simultaneously calling attention to the need for replication and extension in representative samples of adolescents.

To fill the existing evidence gaps on the epidemiology of youth suicide in Canada, the objectives of the current study were to present the 12-month prevalence and socio-demographic, clinical, and behavioural correlates of suicidal ideation and attempts in a representative sample of youth aged 14 to 17 years in Ontario.

Methods

The 2014 OCHS is a province-wide, cross-sectional, epidemiologic study of child health and mental disorder implemented by Statistics Canada. A probability sample of 6,537 households (50.8% response) with 10,802 children aged 4 to 17 y participated. The sampling frame was the 2014 Canadian Child Tax Benefit file. Households were selected based on a complex 3-stage survey design that involved cluster sampling of residential areas and stratification by residency (urban, rural) and income (areas and households cross-classified by 3 levels of income (<20th; 20th to 80th; >80th percentiles). Data were collected in the home by trained interviewers from the person most knowledgeable about all children (98.6% identified as a parent) and from youth aged 12 to 17 y. Questions about suicidal ideation and attempts, non-suicidal self-injury, mental disorders, substance use, peer victimization and exposure to child maltreatment were administered to youth aged 14 to 17 y (n = 2,910) using a computer-assisted, self-administered questionnaire. Detailed accounts of the survey design, content, training and data collection are available elsewhere.[28,29]

Measures

Suicidal ideation and attempt. Suicidal ideation was assessed by asking youth, "In the past 12 months, did you ever seriously consider taking your own life or killing yourself?" (0 = no, 1 = yes). Among youth who endorsed suicidal ideation, suicidal attempt was assessed by asking, "In the past 12 months, how many times did you actually try to take your own life?" (0 = never, 1 = at least once).

Non-suicidal self-injury. The item used to assess non-suicidal self-injury asked, "Sometimes people deliberately harm themselves but they do not mean to take their life. In the past 12 months, did you ever deliberately harm yourself but not mean to take your life?' (0 = no, 1 = yes).

Mental disorder. Youth completed the OCHS Emotional Behavioural Scales (OCHS-EBS),[30] a 52-item symptom checklist that assesses selected DSM-5 disorders referencing the past 6 months. Each item is scored on a 3-point frequency scale, summed to generate a scale score for each disorder and then converted to a binary classification (0 = absent, 1 = present) closest in prevalence to the same disorder identified in the 2014 OCHS by the Mini International Neuropsychiatric Interview for Children and Youth (MINI-KID).[31,32] The OCHS-EBS demonstrates adequate psychometric properties and classifies mental disorder with the same levels of reliability and validity as the MINI-KID.[33] We included depression, attention-deficit hyperactivity disorder, any anxiety

disorder (generalized anxiety disorder, separation anxiety disorder or social anxiety disorder) and any behaviour disorder (oppositional-defiant disorder or conduct disorder).

Smoking. Youth were asked whether they tried or smoked cigarettes or cigars in the past 6 months (0 = no, 1 = yes).

Cannabis, other illicit or prescription drug use without a prescription. Youth were asked a series of questions about cannabis, other illicit drugs and prescription drug use without a prescription or advice by a doctor in the past 6 months. Substances were collapsed into a single, binary classification of any substance use (0 = no, 1 = yes).

Heavy episodic drinking. Youth who endorsed having had 5 or more drinks of alcohol on the same occasion at least once, in the past 4 weeks, were classified as having an episode of heavy drinking (0 = no, 1 = yes).

Peer victimization. Victimization at school by peers was assessed using an abbreviated version of the 2009 School Crime Supplement to the US National Crime Victimization Survey.[34,35] Youth were asked 7 questions about the frequency in which they experienced physical, verbal, and relational victimization by peers during the school year. Response options were: never, once or twice this school year, once or twice this month, once or twice this week, almost every day. Consistent with existing classification systems,[36,37] youth who reported being victimized at least once or twice this month on at least one of the items were classified as having experienced peer victimization (0 = no, 1 = yes).

Exposure to child maltreatment. Youth responded to 9 questions taken from the Childhood Experience of Violence Questionnaire (CEVQ)[38] and existing general population surveys[39,40] to assess the frequency in which an adult committed the following forms of maltreatment while growing up: physical abuse (3 items), sexual abuse (2 items), emotional abuse (1 item), physical neglect (1 item), and exposure to intimate partner violence (2 items). Response options included: never, 1-2 times, 3-5 times, 6-10 times, or more than 10 times. Using existing classification approaches,[38,41-46] individual frequency thresholds were selected for each item to identify the presence of maltreatment type.

Physical abuse was classified as present if one or more of the following criteria were met: 1) being slapped, hit or spanked 3 or more times by an adult; 2) being pushed, grabbed, shoved, or having something thrown at them 3 or more times by an adult; or 3) being kicked, punched, choked, burned, or physically attacked one or more times by an adult. Sexual abuse was classified as present if at least one of the following criteria were met: 1) an adult forced or attempted to force the participant into an unwanted sexual activity through threats or physical violence, or 2) an adult had touched the participant sexually in some way one or more times.

Emotional abuse was classified as present if a parent/caregiver had said things that hurt the respondents' feelings or made them feel unwanted or unloved 3 or more times. Physical neglect was classified as present if the respondent indicated their parent/caregiver did not care for their basic needs one or more times. Exposure to intimate partner violence was classified as present if at least one of the following criteria were met: 1) having seen or heard parents/caregivers say hurtful things to each other or another adult in their home 6 or more times, or 2) having seen or heard parent/caregivers hit each other or another adult in their home 3 or more times.

Youth identified with one or more types of maltreatment were classified as exposed to maltreatment (0 = no, 1 = yes).

Socio-demographic correlates. Standard Statistics Canada questions were administered to the parent about youth age, sex, number of biological parents in the home, household income below the low-income measure (based on the 2013 before tax cut-offs),[47] immigrant background (youth who were foreign-born or who had at least one foreign-born parent were classified as immigrant), and urban-rural residency (large urban v. small-medium urban and rural) based on population density and size.[48]

Sample for Analysis

Youth aged 14 to 17 y ($n = 2{,}910$) were eligible for inclusion in the analysis. Restricting the sample to complete data across study variables resulted in a reduction in sample size of 18% ($n = 2{,}396$). More than half of the respondents excluded from the analyses were missing data specifically related to suicidal ideation and attempts (334/514 = 65.0%). Excluded youth were more likely to be classified with depression, attention-deficit hyperactivity disorder, oppositional-defiant disorder and/or conduct disorder, and to have experienced child maltreatment. To address the problem of missed responses, we used listwise deletion because comparative analyses based on multivariate, multiple imputation by chained equations (MICE) in STATA 14.0[49] produced similar estimates with consistently higher standard errors, failing to meet the objectives of improving power and reducing bias.[50]

Statistical Analysis

Past 12-month prevalence estimates are presented for suicidal ideation and attempts for the overall sample and separately by sex. To examine the extent to which selected socio-demographic, clinical, and behavioural risk variables distinguished among youth reporting on suicidal thoughts and behaviours, 3 mutually exclusive groups were established: 1) non-suicidal, youth who did not endorse suicidal ideation or attempts; 2) suicidal ideation, youth who endorsed suicidal ideation but did not endorse suicidal

Table 1. Past 12-Month Prevalence of Suicidal Ideation and Attempts[a] by Sex ($n = 2,396$).

	12-Month Prevalence, % (SE)			
	Total ($n = 2,396$)	Male ($n = 1,189$)	Female ($n = 1,207$)	OR[b] (95% CI)
Suicidal ideation	8.05 (0.90)	5.53 (1.09)	10.74 (1.44)	**2.06 (1.24–3.41), $P = 0.005$**[†]
Suicidal attempt	4.29 (0.72)	3.19 (0.95)	5.46 (1.09)	1.75 (0.83–3.63), $P = 0.133$

CI, Confidence Interval; OR, Odds Ratio.
[a]Suicidal ideation includes youth who endorsed suicidal ideation alone and/or in combination with suicidal attempt. Suicidal attempt includes youth who endorsed suicidal ideation and attempt.
[b]Reference group is male.
Note: Bold typeface denotes sex differences at $P < 0.05$; [†]Associations robust to false discovery rate correction.

attempt; and 3) suicidal attempt, youth who endorsed both suicidal ideation and attempt. Cross-tabulations of associations between selected variables and these 3 groups are presented. Binary logistic regression models, adjusting for sex and age, were conducted to identify correlates that distinguished between groups. Correlates that reached statistical significance at $P < 0.15$ in the age- and sex-adjusted models were included in a multivariable regression to determine their independent contributions to the prediction of group membership (see Supplemental Table). Coefficients were exponentiated to produce odds ratios (ORs) and associated 95% confidence intervals (95%CIs).

All analyses used sampling weights to generate prevalence estimates that were representative of the target population of youth aged 14 to 17 y in Ontario. To account for the complex survey design, mean bootstrap weights were applied with an adjustment factor to produce accurate standard errors in STATA 14.0.[49] Group differences in selected variables were determined using the second-order Rao-Scott correction to Chi-squared tests (design based F-statistic) for complex survey design.[51] For binary logistic regression models, standard errors were estimated using the Taylor series method[52] and the adjusted ORs and 95%CIs are presented based on design-corrected coefficient variance-covariance matrices. Applying these corrections produced accurate test statistics and associated P values given the complex survey design of the 2014 OCHS.[28] The false discovery rate (FDR) method[53] was employed to account for multiple comparisons.

Results

The 12-month prevalence of suicidal ideation and attempts were 8.1% and 4.3%, respectively (Table 1). The odds of experiencing suicidal ideation were 2 times higher among females than males (OR = 2.06; 95%CI = 1.24 to 3.41).

Table 2 presents the prevalence of socio-demographic, clinical, and behavioural risk variables across the 3 mutually exclusive comparison groups. Among youth who endorsed suicidal ideation ($n = 99 + 87 = 186$), 46.8% (87/186) reported a suicidal attempt. In pairwise comparisons, there were no statistically significant between-group differences associated with youth age or living in poor households. For other socio-demographic variables, compared with non-suicidal youth, the prevalence of suicidal ideation was higher in females and lower among youth living outside of large urban areas; whereas the prevalence of suicidal attempt was higher among youth living with one or no biological parent and lower among youth with an immigrant background.

Rates of all clinical and behavioural risk variables, including mental disorders, non-suicidal self-injury, substance use, peer victimization, and child maltreatment, were significantly higher among youth reporting suicidal ideation or attempts, compared with non-suicidal youth. In contrast, among youth who endorsed suicidal ideation, differences between those who attempted suicide v. those who did not were fewer in number. Rates of non-suicidal self-injury, cannabis or illicit substance use, heavy episodic drinking, and tobacco use were consistently higher among youth who attempted suicide, compared with those who did not (Table 2).

Table 3 presents the results of modelling the between-group differences, adjusting for all candidate variables meeting the inclusion criteria (i.e., see Methods and Supplemental Table for age- and sex-adjusted estimates). Compared with non-suicidal youth, depression and non-suicidal self-injury were each independently associated with an increased odds of suicidal ideation (OR = 4.84 and 4.19, respectively) and suicidal attempt (OR = 7.84 and 22.72, respectively). Anxiety disorders (OR = 2.88) and exposure to child maltreatment (OR = 2.64) were each independently associated with an increased odds of suicidal ideation compared with no suicidality, whereas living in a large urban centre was associated with a decreased odds of suicidal ideation (OR = 0.30). Finally, tobacco use was associated with an increased odds of suicidal attempt compared with no suicidality (OR = 4.19).

Among youth who reported suicidal ideation, non-suicidal self-injury clearly differentiated between those who attempted suicide v. those who did not, and was associated with an increased odds of suicidal attempt (OR = 3.89) (Table 3). The 12-month prevalence of non-suicidal self-injury was 63.6% among youth who attempted suicide, compared with 40.7% among youth who experienced suicidal ideation but no attempts, and 4.9% among non-suicidal youth (Table 2). Overall, the 12-month prevalence of

Table 2. Socio-Demographic, Clinical and Behavioural Correlates of Past 12-Month Suicidal Ideation and Attempts[a] ($n = 2,396$).

	Prevalence, % (SE)				
	Non-Suicidal (N) ($n = 2,210$)	Suicidal Ideation Alone (SI) ($n = 99$)	Suicidal Ideation and Attempt (SA) ($n = 87$)	*F* statistic (df), *P* value	Pairwise Comparisons (N vs. SI, N vs. SA, SI vs. SA)
Socio-demographic Correlates					
Age, mean (SE)	15.49 (0.04)	15.62 (0.17)	15.86 (0.15)	$F_{(2,2394)} = 2.79$, $P = 0.061$	
Female	46.89 (1.93)	67.92 (6.70)	61.51 (8.64)	$\mathbf{F_{(2,4487)} = 4.43, P = 0.014}^{\dagger}$	N < SI
One or no biological parent	33.19 (1.87)	39.73 (7.38)	55.82 (8.33)	$\mathbf{F_{(2,4666)} = 4.67, P = 0.010}^{\dagger}$	N < SA
Poor household	17.31 (1.09)	21.11 (5.26)	20.78 (5.56)	$F_{(2,4722)} = 0.47$, $P = 0.623$	
Immigrant background	40.08 (1.92)	29.12 (6.66)	15.41 (6.30)	$\mathbf{F_{(2,4557)} = 5.62, P = 0.004}^{\dagger}$	N < SA
Large urban centre	87.59 (1.16)	71.48 (7.23)	79.96 (7.32)	$\mathbf{F_{(2,4634)} = 4.11, P = 0.018}^{\dagger}$	N < SI
Clinical Correlates					
Mental disorders					
Depression	2.60 (0.62)	36.39 (7.09)	46.02 (8.49)	$\mathbf{F_{(2,4658)} = 95.02, P < 0.001}^{\dagger}$	N < SI, SA
Any anxiety disorder	7.66 (1.08)	47.08 (7.47)	41.05 (8.45)	$\mathbf{F_{(2,4644)} = 46.62, P < 0.001}^{\dagger}$	N < SI, SA
Oppositional-defiant or conduct disorder	4.97 (0.76)	20.29 (5.46)	26.98 (7.58)	$\mathbf{F_{(2,4508)} = 22.83, P < 0.001}^{\dagger}$	N < SI, SA
Attention-deficit/hyperactivity disorder	5.41 (0.95)	27.48 (6.85)	31.84 (7.92)	$\mathbf{F_{(2,4678)} = 28.73, P < 0.001}^{\dagger}$	N < SI, SA
Behavioural Correlates					
Non-suicidal self-injury	4.93 (0.73)	40.74 (7.33)	63.55 (8.54)	$\mathbf{F_{(2,4608)} = 104.01, P < 0.001}^{\dagger}$	N < SI, SA SI < SA
Cannabis or illicit substance use	13.04 (1.22)	24.49 (6.00)	53.13 (8.54)	$\mathbf{F_{(2,4519)} = 26.74, P < 0.001}^{\dagger}$	N < SI, SA SI < SA
Heavy episodic drinking	10.19 (1.14)	6.26 (2.35)	31.79 (8.63)	$\mathbf{F_{(2,3551)} = 11.17, P < 0.001}^{\dagger}$	N < SA SI < SA
Tobacco use	12.67 (1.29)	20.29 (5.49)	51.98 (8.55)	$\mathbf{F_{(2,4474)} = 25.81, P < 0.001}^{\dagger}$	N < SA SI < SA
Peer victimization	15.78 (1.39)	27.36 (6.04)	38.33 (8.19)	$\mathbf{F_{(2,4490)} = 8.97, P < 0.001}^{\dagger}$	N < SI, SA
Exposure to child maltreatment	23.39 (1.58)	54.73 (7.60)	65.61 (8.37)	$\mathbf{F_{(2,4616)} = 24.16, P < 0.001}^{\dagger}$	N < SI, SA

df, degrees of freedom.

[a]Non-suicidal includes youth who did not endorse suicidal ideation or attempt. Suicidal ideation alone includes youth who endorsed suicidal ideation but did not endorse suicidal attempt. Suicidal ideation and attempt includes youth who endorsed both outcomes.

Note: Bold typeface denotes statistically significant differences at $P < 0.05$; [†]Associations robust to false discovery rate correction.

non-suicidal self-injury in the present study was 8.8%, with rates 4 times higher among females (14.2%) compared with males (3.8%) (data not shown). Heavy episodic drinking, in age- and sex-adjusted models, was significantly associated with elevated odds of suicidal attempt compared with suicidal ideation alone (see Supplemental Table) and was close to significant in the fully adjusted model (OR = 4.64, $P = 0.06$).

Discussion

In a large, provincially, representative sample of youth aged 14 to 17 y, the past 12-month prevalence of suicidal ideation and attempts was 8.1% and 4.3%, respectively. Consistent with previous studies, females exhibited substantially higher prevalence of suicidal ideation than males,[1,6,14] and youth living with one or no biological parent were more likely to report suicidal attempt.[14] Rates of suicidal attempt were lower among youth living in an immigrant family and consistent with analyses of linked immigration, health administrative and vital statistics data documenting lower suicide rates among recent immigrant compared with long-term and non-immigrant youth in Ontario.[9] Our findings linked to residency revealed lower rates of suicidal ideation among youth living in large urban centres compared with small-medium centres and rural areas. Past US-[54] and Ontario-based studies[9] have documented higher suicide rates in rural, compared with urban areas, and US evidence suggests that these rural-urban disparities are widening over time.[54]

Our findings demonstrate that youth reporting suicidal ideation, alone or in association with attempts, experience an array of concurrent mental health challenges, behavioural risks, and psychosocial adversities. The high levels of mental health need associated with youth reporting suicidal thoughts and behaviours indicate that many youth require some form of mental health intervention. However, the opportunities for these youth to obtain help may be limited. Evidence from the US suggests that less than 50% of youth with suicidal thoughts and behaviours have had contact with a mental health specialist in the past year.[15] Analyses of administrative data examining health service use in the year prior to death by suicide among youth in Ontario demonstrated that males were less

Table 3. Multivariate Associations of Socio-Demographic, Clinical and Behavioural Correlates that Distinguish Between Youth with Varying Levels of Suicidality.[a,b]

	Non-suicidal vs. Suicidal Ideation Alone OR[c] (95% CI)	Non-suicidal vs. Suicidal Ideation and Attempt OR[c] (95% CI)	Suicidal Ideation Alone v. Suicidal Ideation and Attempt OR[d] (95% CI)
Socio-demographic Correlates			
Age	1.04 (0.77–1.40), $P = 0.802$	1.07 (0.65–1.76), $P = 0.802$	1.10 (0.71–1.70), $P = 0.679$
Female	1.39 (0.67–2.92), $P = 0.377$	0.43 (0.17–1.09), $P = 0.076$	0.88 (0.29–2.68), $P = 0.819$
One or no biological parent	–	1.82 (0.75–4.41), $P = 0.182$	–
Poor household	–	–	–
Immigrant background	–	0.64 (0.24–1.76), $P = 0.391$	0.39 (0.14–1.06), $P = 0.066$
Large urban centre	**0.30 (0.12–0.73), $P = 0.009$**[†]	–	–
Clinical Correlates			
Mental disorders			
Depression	**4.84 (1.92–12.17), $P = 0.001$**[†]	**7.84 (3.03–20.29), $P < 0.001$**[†]	–
Any anxiety disorder	**2.88 (1.16–7.16), $P = 0.023$**[†]	1.20 (0.44–3.28), $P = 0.727$	–
Oppositional-defiant or conduct disorder	1.44 (0.47–4.48), $P = 0.525$	1.08 (0.28–4.17), $P = 0.908$	–
Attention-deficit/ hyperactivity disorder	1.50 (0.56–4.03), $P = 0.421$	2.18 (0.45–10.52), $P = 0.331$	–
Behavioural Correlates			
Non-suicidal self-injury	**4.19 (1.76–10.01), $P = 0.001$**[†]	**22.72 (8.32–62.06), $P < 0.001$**[†]	**3.89 (1.45–10.43), $P = 0.007$**[†]
Cannabis or illicit substance use	1.48 (0.54–4.06), $P = 0.445$	1.49 (0.60–3.70), $P = 0.384$	1.75 (0.58–5.28), $P = 0.323$
Heavy episodic drinking	-	1.31 (0.39–4.45), $P = 0.663$	4.64 (0.92–23.39), $P = 0.063$
Tobacco use	0.98 (0.35–2.74), $P = 0.962$	**4.19 (1.99–8.86), $P < 0.001$**[†]	1.78 (0.54–5.92), $P = 0.346$
Peer victimization	0.67 (0.29–1.52), $P = 0.338$	1.18 (0.42–3.29), $P = 0.758$	–
Exposure to child maltreatment	**2.64 (1.20–5.78), $P = 0.015$**[†]	2.68 (0.99–7.30), $P = 0.053$	–

CI, Confidence Interval; OR = Odds Ratio.

[a]Non-suicidal includes youth who did not endorse suicidal ideation or attempt. Suicidal ideation alone includes youth who endorsed suicidal ideation but did not endorse suicidal attempt. Suicidal ideation and attempt includes youth who endorsed both outcomes.

[b]Results are based on multivariate, binary logistic regression models controlling for age, sex and correlates reaching statistical significance at $P < 0.15$ in age- and sex-adjusted models.

[c]Reference is the non-suicidal group.

[d]Reference is the suicidal ideation alone group.

Note: Bold typeface denotes statistically significant differences at $P < 0.05$, [†]Associations robust to false discovery rate correction.

likely to receive mental health care compared with females,[11] drawing attention to the importance of increased outreach and access to timely and effective mental health care for youth experiencing suicidal ideation and attempts.

The classification of youth into those not reporting suicidal ideation and attempts, reporting suicidal ideation alone, and reporting both suicidal ideation and attempts reveals a continuum of marked escalation of risk and a common and distinct set of variables differentially associated with this continuum. Mental disorders, particularly depression, differentiated youth with suicidal thoughts or behaviors from those without these outcomes. However, among youth experiencing suicidal ideation, mental disorders did not differentiate between those who attempted suicide and those who did not; these findings are consistent with previous epidemiological community surveys of adults[17,25] and adolescents in the US.[14]

In contrast, among youth who experienced suicidal ideation, the behavioural risk variables— including non-suicidal self-injury, cannabis or other illicit substance use, heavy episodic drinking, and tobacco use—differentiated between youth who attempted suicide and those who did not. In adjusted analyses, non-suicidal self-injury was the only variable that uniquely differentiated between youth classified with ideation alone v. those with attempts. Heavy episodic drinking was also associated with an increased odds of suicidal attempts among youth who experienced ideation in age- and sex-adjusted models.

These findings are consistent with 2 empirical studies[20,21] and theoretical models[55-57] that emphasize the importance of suicide capability—the degree to which an individual feels able to make a suicide attempt—as an important factor that predicts attempts among those who experience ideation. Non-suicidal self-injury may represent a unique risk factor for suicidal attempt, serving as a marker of both increased desire and capability of suicide through habituation to self-inflicted violence and pain.[55,57] Evidence from 2 separate meta-analyses of longitudinal studies report that the strongest risk factor for suicidal attempts is previous non-suicidal self-injury.[2,18] Heavy episodic drinking has also been shown to differentiate between youth who attempt suicide and those who experience ideation alone.[24]

Our findings should be interpreted while considering several limitations. First, the cross-sectional nature of the 2014

OCHS limits our ability to document the temporal ordering of study correlates in relation to the onset of suicidal ideation and transition to attempts. Second, our focus was solely on the presence or absence of suicidal ideation and attempt and associated correlates. We did not attempt to further characterize the severity, complexity, or chronicity of these experiences, which would likely yield a more nuanced understanding of the nature of their co-occurrence. Third, several correlates known to be associated with suicidal thoughts and behaviours, including previous history of suicidal ideation and attempts, psychiatric hospitalizations, and family history of suicide and mental disorders, were not examined. Fourth, the exclusion of youth with mental disorders due to missed responses in the present study might contribute to a downward bias in reported prevalence rates of suicidal ideation and attempts.

Notwithstanding these limitations, the current findings have important implications. First, our findings lend support to theoretical frameworks emphasizing that the emergence of suicidal ideation and the transition from ideation to attempts represent distinct phenomena with different configurations of risk factors. Whereas mental disorders were associated with suicidal ideation, non-suicidal self-injury emerged as the key variable differentiating youth who reported suicidal ideation and attempt and those who reported ideation alone. Second, the strong association between youth suicidality, mental disorders, behavioural risks, and psychosocial adversity draws attention to the public health importance of addressing suicidal thoughts and behaviours. If there is a causal relationship between mental disorders and suicide, focused efforts on prevention, early identification, and effective treatment of mental disorders in youth should lead to reductions in suicidal behaviour. Third, in our findings, non-suicidal self-injury in conjunction with heavy episodic drinking might provide important opportunities for identifying youth likely to attempt suicide. These behavioural indicators can be used to mobilize youth and their peers, parents, educators, and clinicians to identify and facilitate access to effective care for these youth.

Suicidal thoughts and behaviours are common in youth. Although linked to deaths by suicide, they are too common to accurately predict these tragic outcomes.[2] Prospective studies are warranted that use novel methodologies to assess youth in real-time during periods of heightened risk[17,58] to enhance the prediction of suicidal behaviours, including the onset of suicidal ideation and the transition from ideation to attempt.[2,59,60] The importance of addressing suicidal thoughts and behaviours in youth arise from their co-occurrence with mental disorders, behavioural risks, and psychosocial adversity. At present, promising approaches to addressing suicidal thoughts and behaviours in youth might include the effective prevention and treatment of mental disorders and high-risk behaviours, particularly depression, non-suicidal self-injury, and heavy episodic drinking.

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Data Access

Data access available through Statistics Canada Research Data Centres.

Declaration of Conflicting Interests

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Supplemental Material

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